

1652

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RAW SEQUENCE LISTING

DATE: 01/21/2004

PATENT APPLICATION: US/10/671,207

TIME: 12:30:57

Input Set : N:\Cr3\RULE60\10671207.RAW.txt

Output Set: N:\CRF4\01212004\J671207.raw

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1 <110> APPLICANT: O'Donnell, Michael E.
2   Yuzhakov, Alexander
3   Yurieva, Olga
4   Jeruzalmi, David
5   Bruck, Irina
6   Kuriyan, John
7 <120> TITLE OF INVENTION: ENZYMES DERIVED FROM THERMOPHILIC ORGANISMS THAT
8   FUNCTION AS A CHROMOSOMAL REPLICASE, PREPARATION AND
9   USE THEREOF
10 <130> FILE REFERENCE: 22221/1030
11 <140> CURRENT APPLICATION NUMBER: 10/671,207
12 <141> CURRENT FILING DATE: 2003-09-25
13 <150> PRIOR APPLICATION NUMBER: US/09/716,964
14 <151> PRIOR FILING DATE: 2000-11-21
15 <150> PRIOR APPLICATION NUMBER: 60/143,202
16 <151> PRIOR FILING DATE: 1997-04-08
17 <150> PRIOR APPLICATION NUMBER: 08/823,407
18 <151> PRIOR FILING DATE: 1997-04-08
19 <150> PRIOR APPLICATION NUMBER: 09/057,416
20 <151> PRIOR FILING DATE: 1998-04-08
21 <160> NUMBER OF SEQ ID NOS: 212
22 <170> SOFTWARE: PatentIn Ver. 2.1
24 <210> SEQ ID NO: 1
25 <211> LENGTH: 2007
26 <212> TYPE: DNA
27 <213> ORGANISM: Thermus thermophilus
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31   actagccttg tgagcgccct ctaccgccc ttccgcccc tcacctcca ggaggtggtg 180
32   gggcaggagc acgtgaagga gccctcctc aaggccatcc gggaggggag gctcgcccag 240
33   gcctacctct tctccgggcc cagggcggtg ggcaagacca ccacggcgag gctcctcgcc 300
34   atggcggtgg ggtgccaggg ggaagacccc cttgcgggg tctgccccca ctgccaggcg 360
35   gtgcagaggg gcgcccaccc ggacgtggtg gacattgacg ccgccagcaa caactccgtg 420
36   gaggacgtgc gggagctgag ggaaggatc cacctcgccc ccctctctgc ccccaggaag 480
37   gtcttcatcc tggacgaggc ccacatgctc tccaaaagcg ccttcaacgc cctcctcaag 540
38   accctggagg agccccgcgc ccacgtcctc ttggtcttcg ccaccaccga gcccagaggg 600
39   atgcccccca ccatcctctc ccgcacccag cacttccgct tccgcccgtt caggaggagg 660
40   gagatcgctt ttaagctccg gcgcacctg gaggccgtgg ggcgggaggc ggaggaggag 720
41   gccctcctcc tctcgcggcg cctggcggac ggggccctta gggacgcgga aagcctcctg 780
42   gagcgcttcc tctcctgga agggccctc acccggaagg aggtggagcg cgccctaggc 840
43   tcccccccag ggaccgggtt ggccgagatc gccgcctccc tcgcgagggg gaaaacggcg 900
44   gaggccctgg gcctcgcccc gcgcctctac ggggaagggt acgccccgag gagcctggtc 960

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Output Set: N:\CRF4\01212004\J671207.raw

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45  tcgggccttt tggaggtggt ccgggaaggc ctctacgccg ccttcggcct cgcggaacc 1020
46  ccccttcccc ccccgcccca ggccctgata gccgccatga ccgccctgga cgaggccatg 1080
47  gagcgccctg cccgcccgtc cgacgcctta agcctggagg tggccctcct ggaggcgga 1140
48  agggccctgg ccgcccaggc cctaccccag cccacgggcg ctccctcccc agaggtcggc 1200
49  cccaagccgg aaagccccc gaccccgga ccccaaggc ccgaggaggc gcccgaactg 1260
50  cgggagcggg ggcgggcctt cctcgaggcc ctacggccca ccctacgggc ctctgtgcgg 1320
51  gaggccccgc cggaggtccg ggaaggccag ctctgcctcg ctttccccga ggacaaggcc 1380
52  ttccactacc gcaaggcctc ggaacagaag gtgaggctcc tccccctggc ccaggcccat 1440
53  ttcggggtgg aggaggtcgt cctcgtcctg gaggagaaaa aaaaaagcct gagcccaagg 1500
54  ccccgcccgg cccacactcc tgaagcgccc gcacccccgg gccctcccga ggaggaggta 1560
55  gaggcgaggg aagcggcgga ggaggccccg gaggaggcct tgaggcggtt ggtccgcctc 1620
56  ctgggggggc ggggtgctctg ggtgcggcgg cccaggaccc gggaggcgcc ggaggaggaa 1680
57  cccctgagcc aagacgagat agggggtact ggtatataat gggggcatga cgcgaccac 1740
58  cgacctcgga caagagaccg tggacaacat cctcaagcgc ctccgccgta ttgagggcca 1800
59  ggtgcggggg ctccagaaga tgggtggcga gggcgcccc tgcgacgagg tctcaccca 1860
60  gatgaccgcc accaagaagg ccatggaggc ggcgccacc ctgatcctcc acgagttcct 1920
61  gaacgtctgc gccgccgagg tctccgaggg caaggtgaac cccaagaagc ccgaggagat 1980
62  cgccaccatg ctgaagaact tcactca 2007

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64 <210> SEQ ID NO: 2

65 <211> LENGTH: 529

66 <212> TYPE: PRT

67 <213> ORGANISM: Thermus thermophilus

68 <400> SEQUENCE: 2

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70      1             5             10             15
71  Val Gly Gln Glu His Val Lys Glu Pro Leu Leu Lys Ala Ile Arg Glu
72      20             25             30
73  Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly
74      35             40             45
75  Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly
76      50             55             60
77  Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg
78      65             70             75             80
79  Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser
80      85             90             95
81  Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
82      100            105            110
83  Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
84      115            120            125
85  Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
86      130            135            140
87  His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
88      145            150            155            160
89  Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
90      165            170            175
91  Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg
92      180            185            190
93  Glu Ala Glu Glu Glu Ala Leu Leu Leu Leu Ala Arg Leu Ala Asp Gly
94      195            200            205

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95   Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu
96       210                215                220
97   Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro
98   225                230                235                240
99   Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr
100                245                250                255
101   Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala
102                260                265                270
103   Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu
104                275                280                285
105   Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln
106                290                295                300
107   Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu
108   305                310                315                320
109   Ala Arg Arg Ser Asp Ala Leu Ser Leu Glu Val Ala Leu Leu Glu Ala
110                325                330                335
111   Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro
112                340                345                350
113   Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro
114                355                360                365
115   Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe
116   370                375                380
117   Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg
118   385                390                395                400
119   Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys
120                405                410                415
121   Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro
122                420                425                430
123   Leu Ala Gln Ala His Phe Gly Val Glu Glu Val Val Leu Val Leu Glu
124                435                440                445
125   Gly Glu Lys Lys Ser Leu Ser Pro Arg Pro Arg Pro Ala Pro Pro Pro
126                450                455                460
127   Glu Ala Pro Ala Pro Pro Gly Pro Pro Glu Glu Glu Val Glu Ala Glu
128   465                470                475                480
129   Glu Ala Ala Glu Glu Ala Pro Glu Glu Ala Leu Arg Arg Val Val Arg
130                485                490                495
131   Leu Leu Gly Gly Arg Val Leu Trp Val Arg Arg Pro Arg Thr Arg Glu
132                500                505                510
133   Ala Pro Glu Glu Glu Pro Leu Ser Gln Asp Glu Ile Gly Gly Thr Gly
134                515                520                525
135   Ile
137 <210> SEQ ID NO: 3
138 <211> LENGTH: 1590
139 <212> TYPE: DNA
140 <213> ORGANISM: Thermus thermophilus
141 <400> SEQUENCE: 3
142   gtgagcgccc tctaccgccg cttccgcccc ctcaccttcc aggaggtggt ggggcaggag 60
143   cacgtgaagg agccctcct caaggccatc cgggagggga ggctcgccca ggcctacctc 120
144   ttctccgggc ccaggggcgt gggcaagacc accacggcga ggctcctcgc catggcggtg 180

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Output Set: N:\CRF4\01212004\J671207.raw

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145 ggggtgccagg ggggaagaccc cccttgccggg gtctgcccc actgccaggc ggtgcagagg 240
146 ggcgcccacc cggacgtggt ggacattgac gccgccagca acaactccgt ggaggacgtg 300
147 cgggagctga gggaaaggat ccacctcgcc cccctctctg cccccaggaa ggtcttcac 360
148 ctggacgagg cccacatgct ctccaaaagc gccttcaacg ccctcctcaa gacctggag 420
149 gagccccgcg cccacgtcct ctctgtcttc gccaccaccg agcccagag gatgcccccc 480
150 accatcctct cccgcaccca gcacttcgcg ttccgccgcc tcacggagga ggagatcgcc 540
151 tttaagctcc ggcgcaccc ggaggccgtg gggcgggagg cggaggagga ggcctcctc 600
152 ctctcgcgcc gccggccgga cggggccctt agggacgcgg aaagcctcct ggagcgcttc 660
153 ctctcctctg aaggccccct caccggaag gaggtggagc gcgcctagg ctcccccca 720
154 gggaccgggg tggccgagat cgccgcctcc ctcgcgagg ggaaaacggc ggaggccctg 780
155 ggcctcgccc ggcgctcta cggggaagg tacgccccga ggagcctggt ctcgggcctt 840
156 ttggaggtgt tccgggaagg cctctacgcc gccttcggcc tcgcggaac ccccttccc 900
157 gccccgcccc aggcctgat cgccgccatg accgccttg acgaggccat ggagcgctc 960
158 gccgcgct cgcacgcctt aagcctggag gtggccctcc tggaggcggg aagggcctg 1020
159 gccgcgagg cctacccca gccacgggc gctcctccc cagaggtcgg cccaagceg 1080
160 gaaagcccc cgaccccgga accccaagg cccgaggagg cgcgcgacct gcgggagcg 1140
161 tggcgggcct tcctcgagg cctcaggccc accctacggg ccttcgtgcg ggaggccgc 1200
162 ccggagggtc ggaaggcca gctctgcctc gctttcccc aggacaaggc cttccactac 1260
163 cgcaaggcct cggaacagaa ggtgaggctc ctccccctg cccaggccca ttctggggtg 1320
164 gaggagggtc tcctcgctc ggaggagaa aaaaaaagc tgagcccaag gccccgccc 1380
165 gccccacctc ctgaagcgc cgcaccccc ggccctccc aggaggagg agaggcggag 1440
166 gaagcggcg aggaggccc ggaggaggc ttgaggcggg tggtcgcct cctggggggg 1500
167 cgggtgctct gggtgcgcg gcccaggacc cgggaggcgc cggaggagga acccctgagc 1560
168 caagacgaga taggggtac tggtatataa 1590

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170 <210> SEQ ID NO: 4

171 <211> LENGTH: 464

172 <212> TYPE: PRT

173 <213> ORGANISM: Thermus thermophilus

174 <400> SEQUENCE: 4

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176      1              5              10              15
177 Val Gly Gln Glu His Val Lys Glu Pro Leu Leu Lys Ala Ile Arg Glu
178      20              25              30
179 Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly
180      35              40              45
181 Lys Thr Thr Thr Ala Arg Leu Ala Met Ala Val Gly Cys Gln Gly
182      50              55              60
183 Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg
184      65              70              75              80
185 Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser
186      85              90              95
187 Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
188      100             105             110
189 Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
190      115             120             125
191 Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
192      130             135             140
193 His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
194      145             150             155             160

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195 Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
196                               165                               170                               175
197 Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg
198                               180                               185                               190
199 Glu Ala Glu Glu Glu Ala Leu Leu Leu Ala Arg Leu Ala Asp Gly
200                               195                               200                               205
201 Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu
202                               210                               215                               220
203 Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro
204                               225                               230                               235                               240
205 Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr
206                               245                               250                               255
207 Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala
208                               260                               265                               270
209 Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu
210                               275                               280                               285
211 Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln
212                               290                               295                               300
213 Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu
214                               305                               310                               315                               320
215 Ala Arg Arg Ser Asp Ala Leu Ser Leu Glu Val Ala Leu Leu Glu Ala
216                               325                               330                               335
217 Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro
218                               340                               345                               350
219 Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro
220                               355                               360                               365
221 Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe
222                               370                               375                               380
223 Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg
224                               385                               390                               395                               400
225 Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys
226                               405                               410                               415
227 Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro
228                               420                               425                               430
229 Leu Ala Gln Ala His Phe Gly Val Glu Glu Val Val Leu Val Leu Glu
230                               435                               440                               445
231 Gly Glu Lys Lys Lys Pro Glu Pro Lys Ala Pro Pro Gly Pro Thr Ser
232                               450                               455                               460
234 <210> SEQ ID NO: 5
235 <211> LENGTH: 454
236 <212> TYPE: PRT
237 <213> ORGANISM: Thermus thermophilus
238 <400> SEQUENCE: 5
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240 1 5 10 15
241 Val Gly Gln Glu His Val Lys Glu Pro Leu Leu Lys Ala Ile Arg Glu
242 20 25 30
243 Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly
244 35 40 45

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RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/10/671,207

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Input Set : N:\Crf3\RULE60\10671207.RAW.txt
Output Set: N:\CRF4\01212004\J671207.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:17; Xaa Pos. 2,3,5
Seq#:29; N Pos. 6,12,21
Seq#:30; N Pos. 7,10,19,22
Seq#:42; N Pos. 7,8,13,14
Seq#:43; N Pos. 8,9,17,18
Seq#:66; Xaa Pos. 3,5
Seq#:67; Xaa Pos. 4,7
Seq#:68; Xaa Pos. 3,5
Seq#:89; Xaa Pos. 79
Seq#:91; Xaa Pos. 47,57

VERIFICATION SUMMARY

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Input Set : N:\Crf3\RULE60\10671207.RAW.txt

Output Set: N:\CRF4\01212004\J671207.raw

L:405 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:408 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:17
L:411 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:17
L:414 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:17
L:415 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:17 after pos.:0
L:769 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:772 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:29
L:775 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:29
L:778 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:29
L:779 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:29 after pos.:0
L:787 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:790 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:30
L:793 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:30
L:796 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:30
L:799 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:30
L:800 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:30 after pos.:0
L:907 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:910 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:42
L:913 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:42
L:916 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:42
L:919 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:42
L:920 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42 after pos.:0
L:928 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:931 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:43
L:934 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:43
L:937 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:43
L:940 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:43
L:941 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:43 after pos.:0
L:1141 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:1144 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:66
L:1147 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:66
L:1148 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:66 after pos.:0
L:1157 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:1160 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:67
L:1163 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:67
L:1164 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:67 after pos.:0
L:1173 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:1176 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:68
L:1179 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:68
L:1180 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:68 after pos.:0
L:1650 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:89 after pos.:64
L:1710 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:91
L:1715 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:91 after pos.:32
M:341 Repeated in SeqNo=91
L:5640 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:5643 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:193
L:5646 M:258 W: Mandatory Feature missing, <220> Tag not found for SEQ ID#:193